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ABSTRACT

This is the final report on a project designed to determine the feasibility of implementing FRAND, a computer-assisted instructional program (CAI) as part of regular grade ten French instruction. The program, as designed at the University of Alberta, was used to teach beginning French students to read and write in the target language. The program represented approximately one semester of introductory French instruction. The subjects consisted of two classes of grade ten French students who used different texts during regular class hours, and who were bused to the University during regular French periods for one and a half hours of CAI twice weekly for a period of 10 weeks. Results of achievement comparison tests between CAI and control groups indicate that the CAI students did not suffer in terms of prescribed school curriculum even though they spent up to 30 hours less time in its use than regular groups. A questionnaire designed to measure attitudes toward FRAND was administered to the students when they had completed the final achievement test. Attitudes in both experimental groups were very positive. Advantages of CAI include the individualized nature of the instruction, the immediate feedback given to each student, and the necessity of mastery of given material before advancement to new material. (AM)

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COMPUTER-ASSISTED INSTRUCTION IN SECONDARY SCHOOL FRENCH

FINAL REPORT

RIR-76-9

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COMPUTER-ASSISTED INSTRUCTION IN SECONDARY SCHOOL FRENCH

FINAL REPORT*

PURPOSE

The purpose of the project was to determine the feasibility of implementing FRAND, a computer-assisted instructional (CAI) program as part of regular grade ten French 10 instruction.

THE PROGRAM

FRAND was developed at the University of Alberta for use on the IBM 1500 instructional computer. The program is designed to teach beginning French students to read and write in the target language. These skills are taught within the framework of a three-skills approach: listening, reading, and writing. The grammatical content of the program is based on the Français Fondamental (Hessel et al., 1959) and represents approximately one semester of introductory French instruction.

A student must attain a minimum proficiency level of 80% on any response portion of each of the twenty instructional units and six quizzes before he is allowed to continue (Bloom, 1971). If he does not attain the criterion, he is rerouted through an appropriate revision phase. In addition to the basic program, the student has a choice of learning strategy with which to proceed through the course. This allows him considerable flexibility in how he uses the CAI program. For further elaboration on FRAND, the reader is referred to McEwen (1975) and the Appendix.

SAMPLE

The sample consisted of two classes of grade ten French 10 students at Harry Ainlay Composite High School (HACHS). The spring group consisted of eighteen students who followed the Voix et Images de France (Renard and Heinle, 1969) method of instruction during regular classroom instruction. This class will be referred to hereafter as the VIF group. The fall group consisted of twenty-one students who followed the Le Français International (Calvé et al., 1972) method during regular classroom instruction. This class will be referred to hereafter as the LFI group. (The difference in methods was a result of a policy change of the Edmonton Public School Board with respect to the grade ten beginners French course.)

Students, unaware of their involvement in the project until the first day of class, were permitted to transfer to another section of French 10 if they felt unable or unwilling to participate. No student chose to do so.

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*This research project was supported in part by the Alberta Department of Education.

PROCEDURE

Each class was bused to the University during regular French periods for one and one-half hours of CAI twice weekly for a period of ten weeks. Students unable to complete the program in the allotted time were given additional opportunities to do so.

Classroom activities for both the VIF and LFI groups followed the methodology outlined by the respective methods of instruction. The reading and writing portions of instruction for the VIF group were the total responsibility of the CAI program until after its completion. For the LFI group, the reading and writing exercises of the student workbook I were completed. The average proportion of time spent on reading and writing activities during the experiment was less than fifteen percent for the LFI group.

RESULTS AND DISCUSSION

The CAI Program

In any discussion of the value of CAI, the examination of student achievement, rate of program completion, and attitudes toward the program are of central concern. The evaluation of the CAI program under investigation makes provision for detailed analysis of each of these variables.

At the completion of the instructional units of FRAND, a final achievement test measures student proficiency on all parts of the course. The criterion for successful completion of the course remains 80% as throughout the program. The achievement score for each student on the final test is the score for the first pass through any section of the course. As throughout the program, all student responses are recorded by the computer for further analysis. The program completion time for each student is also maintained by the computer.

A paper and pencil attitude questionnaire designed specifically to determine attitudes toward FRAND was administered to the students once they had completed the final achievement test. The questionnaire consists of seventy items, each of which is scored according to a five point Likert scale. The higher the score, the more favorable the attitude toward the program. Included in the questionnaire are subtests for attitudes toward program components, procedures, learning strategies, transfer to school French, use of the computer for instruction, and CAI facilities.

Table I presents the means and standard deviations for each of the above mentioned variables for the VIF and LFI groups. The differences in achievement scores and the time taken to complete the program by the two groups are attributed in part to the observed diversity of the composition of the two groups and to procedures used to compensate for student variation. The VIF group was very heterogeneous and slow learners in it were not identified early enough so that accommodations for their rate of learning could be made. A standardized aptitude test was administered to the LFI group prior to CAI so that students with potential learning problems could be identified early.

TABLE I

MEANS AND STANDARD DEVIATIONS FOR COMPUTER ACHIEVEMENT, COMPLETION TIME, AND ATTITUDES FOR THE VIF AND LFI GROUPS (N=39)

Group	N		Achievement Score (360)	Completion Time (hours)	Attitude* 1 (85)	2 (55)	3 (60)	4 (55)	5 (55)	6 (40)	TOT (35
VIF	18	$\bar{X}$	286.44	21.45	57.72	34.39	35.50	36.56	40.78	26.50	231.
		s	47.72	6.98	7.04	5.56	6.41	5.41	6.34	3.56	28.
LFI	21	$\bar{X}$	296.24	19.72	59.19	35.05	35.05	38.33	39.19	25.76	232.
		s	26.30	2.84	5.86	5.14	6.22	4.45	5.88	3.83	23.
TOTAL	39	$\bar{X}$	291.72	20.52	58.51	34.74	35.76	37.51	39.92	26.10	232.
		s	38.04	5.25	6.47	5.35	6.32	5.00	6.15	3.73	25.

*Attitude Subtests:
1 Program Components
2 Program Procedures
3 Learning Strategies
4 Transfer
5 CAI
6 Facilities

In addition, the LFI students were given an outline of which units should be completed by a certain date in order to finish the program in the allotted time. They were encouraged to use the CAI facilities on their own time if necessary in order to stay within the predetermined time limits. (A consequence of this availability of additional time was that several students came to the University outside of prescribed times and completed the program very quickly). As a result of these procedures, the variation among students in the LFI group was found to be considerably less apparent.

The attitude scores for both groups remained quite consistent. The attitudes toward the program were considered to be very positive. These results suggest that the students did in fact enjoy their CAI experience. Informal discussion with the students confirmed this. Another example of a positive attitude toward the CAI program is that students willingly gave up two lunch hours weekly (for travel time to and from the University) in order to participate in the project. Futhermore, when students came to the University on their own time when not required to do so indicates that the experience was a rewarding one.

LFI Achievement

An achievement test covering the content of the first six lessons (the number of lessons to be completed by the Christmas break) of LFI was developed by the investigators. The test consisted of an oral and written subtest each of which combined linguistic and cognitive components. The test was administered to a class of French 10 students who had just completed the first six lessons of LFI. The students came from another high school. The results were analyzed for reliability and compared against the teacher's marks on the identical content to determine the test's validity. The test was found to be highly valid for the content of lessons 1 - 6 of LFI. It was revised in order to improve its reliability.

The purpose of the test was to determine whether or not the CAI group was at a disadvantage relative to students following the prescribed curriculum. Final French 10 course grades were also used for comparative purposes. In order to compare the CAI students with the students following the regular LFI method of instruction a control group of equal size (N=21) was established according to the following procedure.

At the beginning of the fall semester, all French 10 students at HACHS were administered the Modern Language Aptitude Test (Carroll and Sapon, 1959) and selected Attitude Scales (Gardner et al., 1974). From the three classes of French 10 students not involved in the CAI project, an equal number of students whose aptitude and attitude scores matched those of the CAI group was chosen to act as the control group. As the control students were chosen on the basis of aptitude and attitude scores, they did not all come from the same class so that a teacher effect should not be apparent. It was felt that this type of matching was the most appropriate for purposes of comparing the CAI students against regular LFI students.

A computer program designed to compute a two-sample Hotelling T^2 Test (Bay and Hunka, 1973) was used to compare the sample means for the CAI and control groups. This statistic tests the null hypothesis for differences between means for two independent samples for all variables simultaneously. Hotelling T^2 Test is described in detail in Morrison (1976).

Table II presents the results of comparing the means for the CAI and control groups on LFI oral and written subtests, and on the final grade assigned. Complete achievement data were not available for two of the control students which resulted in their CAI counterparts being eliminated for purposes of the analysis. No significant differences were found between the CAI and control groups. The greatest amount of difference, although not statistically significant, existed for the oral test which is not surprising since the CAI students were engaged in up to three hours less oral work per week than the control students. The differences in means for the written test and final grades were negligible.

The results of the LFI achievement comparison between CAI students and control students are encouraging in that they demonstrate that the CAI students did not suffer in terms of prescribed school curriculum even though they spent up to thirty hours less time engaged in its use. However, since the achievement measures were so content-dependent, they do not reflect possible differences in French skills for the CAI and control groups. There may actually be differences in certain skills between the two groups although the measuring instruments were not designed to reflect any. It would have been interesting to see how well the control group could have done on a CAI content-dependent achievement test. The use of a standardized test which is method-free might demonstrate differences between CAI students and those following the regular class instruction.

IMPLICATIONS

The CAI students who had mastered the content of FRAND were unable, as were the control students, to master the content of LFI as measured by the achievement test since mastery by all students cannot be an objective of regular classroom instruction given the teaching conditions and time restrictions. Since learning French in the early stages is primarily a skill, the effect of compounding error is cumulative. Whereas the CAI student in the study continued to the next level of instruction only after mastering the content of the prerequisite unit, no such controls apply in the traditional classroom.

The use of CAI has several advantages over traditional instruction. The possibility of specifying a predetermined criterion level permits all students to attain mastery of the content before continuing to the next unit. CAI provides the student with more instructional contact as well as his active involvement in the learning process at all times. The student's progress is not dependent on his classmates but rather on his own ability to learn the material. The immediate feedback given by the computer for each response allows prompt correction of errors. In essence, the computer can act as a private tutor for each student.

TABLE II

HOTELLING'S T^2 TEST FOR COMPARING MEANS OF THE CAI AND CONTROL GROUPS ON LFI ORAL, WRITTEN, AND FINAL GRADE SIMULTANEOUSLY

Group	N	Oral (51)	Written (50)	Final (100)	T^2	df	F	P
CAI	19	24.00	27.26	70.74				
					3.06	3.34	0.96	0.42
Control	19	28.63	29.32	73.16				

RECOMMENDATIONS

Two major recommendations for further research come to mind as a result of the present study. Another group of French 10 students should be involved in a similar project in which more detailed analysis between CAI and regular students could be undertaken. Both groups could be given a battery of testing instruments to determine possible differences if any exist between CAI and regularly-instructed students.

A second major recommendation concerns the determination of the level of achievement over time of the CAI and control students in the present study. This would permit some possible indication of the effect of mastery or lack thereof on achievement maintenance over time. Such a comparison could also indicate the importance of other useful information such as student attrition rate and attitudes toward continued French Study.

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APPENDIX

COURSE OUTLINE

Cap. 1 Qui est-ce?
- 1A Introduction of females
- 1B Recognition quiz of females (3/3)*
- 1C Introduction of males
- 1D RQ of males (3/3)
- 1E Typing answers quiz (8/10)
- 1F Typing questions quiz (5/6)

Cap. 2 Qu'est-ce que c'est
- 2A Introduction of feminine objects
- 2B RQ of feminine objects (3/3)
- 2C Intro. of masculine objects
- 2D RQ of masculine objects (4/4)
- 2E Typing answers, feminine (4/5)
- 2F Typing answers, masc. (5/6)
- 2G Typing questions (5/6)

Quiz 1A People (5/6)
- 1B Objects (5/6)
- 1C Mixed (7/8)
- 1D Posing questions (6/7)

Cap. 3 Quelle, Quel
- 3A Feminine Quelle intro.
- 3B R.Q. (3/3)
- 3C Masc. Quel intro.
- 3D R.Q. (3/3)
- 3E Masc. & Fem. R.Q. (5/6)
- 3F Mixed typing answers (5/6)
- 3G Mixed typing questions (5/6)

Cap. 4 Ce Sont...
- 4A Present people, gender mixed
- 4B R.Q. (5/6)
- 4C Present objects
- 4D R.Q.
- 4E Typing answers (5/6)
- 4F Typing questions (4/5)

Cap. 5 Quelles, Quels
- 5A Present objects, gender mixed
- 5B R.Q. (3/3)
- 5C Present masc. quels.
- 5D R.Q. (3/3)
- 5E Present masc. and Fem. mixed, people
- 5F R.Q. (5/6)
- 5G Typing answers (5/6)
- 5H Typing questions

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*Indicates criterion needed to move to next step.

Quiz 2A People, s. and p. (6/7) (27/33)
2B Objects, s. and p. (4/5)
2C Quelle, Quelles (5/6)
2D Quel, quels (4/5)
2E Mixed m. and f., s. and p. people (3/4)
2F Posing questions (5/6)

Cap. 6 La Famille Leduc
6A Introduce family
6B f. familial relationships
6C f. R.Q. (3/4)
6D m. familial relationships
6E m. R.Q. (3/4)
6F Typing answers (7/9)

Cap. 7 Sa Son Ses...
7A Sa
7B Son
7C Ses
7D R.Q.(9/11)
7E Typing answers (6/7)

Cap. 8 First and second person sing. Possessive Adjectives
8A Present ma, ta, votre
8B Typing answers (3/3)
8C Present ton, mon
8D Typing answers (3/3)
8E Present plurals
8F Typing (5/6)
8G Typing questions (4/5)

Quiz 3A Family (6/7) (34/40)
3B Poss. Adj. Fem. (6/7)
3C Poss. Adj. Masc. (6/7)
3D Poss. Adj. Plural (6/7)
3E Poss. Adj. Mixed (10/12)

Cap. 9 Qu'est-ce que____fait?
9A Introduce elle
9B R.Q. (3/3)
9C Introduce il
9D R.Q. (3/3)
9E Typing mixed (5/6)

Cap. 10 Donner à parler à
10A Present fem. 3rd p.s.
10B Typing (3/4)
10C Present masc. 3rd p.s.
10D Typing (3/4)
10E Typing mixed (5/6)
10F Typing questions (4/5)

Cap. 11 Qu'est-ce que___et___font?
- 11A Present fem. 3rd pp
- 11B R.Q. (3/3)
- 11C Present masc. 3rd pp
- 11D R.Q. (3/3)
- 11E Typing mixed (3/4)
- 11F Typing questions mixed (3/4)

Cap. 12 1 + 2 person of 1st Conjugation verbs
- 12A Present Vous-Je
- 12B Present Vous-Nous
- 12C R.Q. (3/3)
- 12D Typing (4/5)
- 12E Typing questions (4/5)

Quiz 4A Qu'est-ce que___fait (4/5) (19/24)
- 4B Qu'est-ce que___et___font (4/5)
- 4C Typing questions (4/5)
- 4D Typing mixed (7/9)

Cap. 13 Comment est...?
- 13A Present feminines
- 13B R-Q (4/4)
- 13C Present masc.
- 13D R.Q. (4/4)
- 13E Masc. object
- 13F Typing (7/8)
- 13G Typing questions (5/6)

Cap. 14 De quelle couleur...?
- 14A Present colours, no agreement
- 14B R.Q. (3/3)
- 14C Present colours, no agreement, plural
- 14D R.Q. (3/3)
- 14E Present colours, fem. agreement
- 14F R.Q. (3/3)
- 14G Present colours, masc. agreement
- 14H R.Q. (3/3)
- 14J Typing (5/6)
- 14K Typing questions (5/6)
- 14L Typing (7/8)

Quiz 5A Comment est...? (5/6) (24/28)
- 5B De quelle couleur...? (7/8)
- 5C Typing questions, mixed (5/6)
- 5D Typing mixed (7/8)

Cap. 15 Avoir Singular
- 15A Present 3 ps
- 15B Typing (5/6)
- 15C Present 1 and 2 ps
- 15D Typing (3/4)
- 15E Typing questions (5/6)

Cap. 16 Avoir Plural
- 16A Present 3 pp
- 16B Typing (3/4)
- 16C Present 1 and 2 pp
- 16D Typing (3/4)
- 16E Typing questions (5/6)

Cap. 17 être singular
- 17A Present 3 ps
- 17B Present 1 and 2 ps
- 17C Typing (5/6)
- 17D Typing questions (5/6)

Cap. 18 être plural
- 18A Present 3 pp
- 18B Present 1 and 2 pp
- 18C Typing (3/4)
- 18D Typing questions (3/4)

Cap. 19 Qù est...?
- 19A Present feminines
- 19B R.Q. (2/2)
- 19C Present masculines
- 19D R.Q. (2/2)
- 19E Typing (5/6)
- 19F Typing questions (7/8)

Cap. 20 ne...pas
- 20A Present with être
- 20B Typing (6/7)
- 20C Present Si with neg. correct ans.
- 20D Typing (4/5)

Quiz 6A Avoir (8/9) (38/48)
- 6B Avoir questions (5/7)
- 6C être (7/8)
- 6D être questions (5/6)
- 6E Qu est... (7/8)
- 6F Ne...pas (3/4)
- 6G Si (3/4)

FQuiz A1 Qui est-ce? (4/5)
Qu'est-ce que c'est? (5/6)
Typing questions (3/4)
Quelle... (4/5)
Quelle questions (5/6)
La Famille (7/8)
Poss. Adj. (15/18)
____fait, and____and____font (7/8)
Typing questions (3/4)
Verbs (9/12)
Comment est; de quelle couleur (8/10)
Typing questions (4/5)
Avoir (5/6)
Typing questions (4/5)
être (5/6)
Typing questions (4/5)
ne...pas, and si (6/7)